

REMARKS

This application has been reviewed in light of the Office Action dated June 15, 2004. An RCE is enclosed herewith. Claims 1-3 and 7-11 are pending in this application. Claims 1 and 8, which are in independent form, have been amended to define still more clearly what Applicants regard as their invention, in terms that distinguish over the art of record. Favorable reconsideration is requested.

Claim 1-3 and 9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Application Laid-Open No. 09-098970 (Endo et al.) in view of Japanese Patent Application Laid-Open No. 06-313392 (Umibe et al.), and further in view of U.S. Patent No. 5,591,963 (Takeda et al.); Claim 7 was rejected as being obvious from Endo et al., Umibe et al., in view of Takeda et al., and further in view of U.S. Patent No. 5,591,960 (Furukawa et al.) and U.S. Patent No. 4,740,710 (Arita); Claim 8 was rejected as being obvious from Endo et al. in view of Umibe et al., Takeda et al., and U.S. Patent No. 5,596,198 (Perez-Mendez), or, in the alternative, in view of Umibe et al., Takeda et al., and U.S. Patent No. 4,179,100 (Sashin et al.); Claim 10 was rejected as being obvious from Endo et al. in view of Umibe et al., Takeda et al., and Perez-Mendez, or, in the alternative, in view of Umibe et al., Takeda et al., and Sashin et al., and further in view of Japanese Patent Application Laid-Open No. 63-250634A (Takeuchi et al.); and Claim 11 was rejected as being obvious from Endo et al. in view of Umibe et al. and Takeda et al., and further in view of Japanese Patent Application Laid-Open No. 6-029510A (Hikiji et al.). Applicants respectfully traverse these rejections.

Applicants submit that amended independent Claims 1 and 8, together with the remaining dependent claims are patentably distinct from the proposed combination of the cited prior art for at least the following reasons.

The aspect of the present invention set forth in Claim 1 is a photoelectric converter that includes a photoelectric conversion element of a laminated structure including a first electrode layer, an insulation layer, a photoelectric conversion semiconductor layer, an injection blocking layer, a second electrode layer, and a switching means. The insulation layer is for blocking the passage of holes and electrons. The injection blocking layer blocks the injection of holes or electrons (but not both) into the photoelectric conversion semiconductor layer. The switching means operates the photoelectric converter by switching through operation modes including a photoelectric conversion mode, an idling mode, and a refresh mode. In the photoelectric conversion mode are emitted holes or electrons, whichever are emitted in the idling mode, generated in accordance with an amount of incident light and read image information. In the idling mode, which is not used for reading image information, holes or electrons, whichever are emitted in the photoelectric conversion mode, are emitted from the photoelectric conversion element by connecting the switching element and an idle terminal connected to a power source for applying an electric field weaker than an electric field applied at the photoelectric conversion mode. The converter also includes a power source portion having at least a potential for the photoelectric conversion mode, a potential for the idling mode and a potential for the refresh mode and providing the photoelectric conversion element with an electric field, wherein the potential for the idling mode provides, in the idling

mode, the photoelectric conversion element with an electric field which is in the same direction as the photoelectric conversion mode and which is weaker than an electric field applied in the photoelectric conversion mode.

Among the notable features of Claim 1 is that the converter also includes a power source portion having at least a potential for the photoelectric conversion mode, a potential for the idling mode and a potential for the refresh mode and providing the photoelectric conversion element with an electric field, wherein the potential for the idling mode provides, in the idling mode, the photoelectric conversion element with an electric field which is in the same direction as the photoelectric conversion mode and which is weaker than an electric field applied in the photoelectric conversion mode. Support in the specification for this feature can be found at least in paragraphs [0056], [0108], [0124], [0125], [0127], and [0128], with reference to Figures 19 and 20.

A photoelectric converter having the features recited in Claim 1 obtains the following effects. That is, while preventing the flat band voltage V_{FB} from moving in a negative voltage direction more than needed, electrons or holes injected into the interface defect between the “i” layer and the insulation layer can be emitted toward the D electrode direction. It is possible to provide a high state of S/N which can be instantly used at the start of actual usage, with the result that a high quality photoelectric conversion element which can be favorably used can be supplied.

Endo et al. discusses the potential for the photoelectric mode V_s and the potential for the refresh mode V_r of a photoelectric converter having an MIS type photoelectric conversion element. Umibe et al. discusses the potential for the photoelectric

conversion mode V_s (111) and the potential for the refresh mode V_r (112) of a photoelectric converter having an MIS type photoelectric conversion element. Takeda does not disclose an MIS type photoelectric converter but discusses the potential for the photoelectric conversion mode 111 and the ground for refresh. Applicants submit, however, that nothing has been found in the cited prior art, when taken separately or in any proposed combination (assuming such combination would even be permissible) that would teach or suggest a converter that includes a power source portion having at least a potential for the photoelectric conversion mode, a potential for the idling mode and a potential for the refresh mode and providing the photoelectric conversion element with an electric field, wherein the potential for the idling mode provides, in the idling mode, the photoelectric conversion element with an electric field which is in the same direction as the photoelectric conversion mode and which is weaker than an electric field applied in the photoelectric conversion mode, as recited in Claim 1.

Accordingly, Applicants submit that at least for this reason, Claim 1 is patentable over the cited prior art.

Independent Claim 8 is a system claim that includes the feature of a power source portion, as recited in Claim 1. Accordingly, Claim 8 is believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

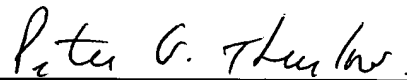
A review of the other art of record has failed to reveal anything that, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as applied against the independent claims herein. Therefore, those claims are respectfully submitted to be patentable over the art of record.

The other rejected claims in this application depend from one or another of the independent claims discussed above and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and allowance of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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